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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/446,144	03/02/2000	CARLO RUBBIA	P5634	1854
7590	08/13/2004		EXAMINER	
MICHAEL L KENAGA RUDNICK & WOLFE PO BOX 64807 CHICAGO, IL 60664-0807			KEITH, JACK W	
			ART UNIT	PAPER NUMBER
			3641	

DATE MAILED: 08/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/446,144	RUBBIA, CARLO
	<b>Examiner</b>	<b>Art Unit</b>
	Jack W. Keith	3641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 07 June 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) 10,11,13-16,26,27,29,30 and 33-48 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-9,12,17-25,28,31 and 32 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 07 June 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Response to Arguments***

1. Applicant's arguments filed 6/7/2004 have been fully considered but they are not persuasive.

At the onset the drawing submission of figure 7b is acceptable.

The 112, 2<sup>nd</sup> paragraph rejection of claims 1, 3, 4, and 17-19 regarding the term "portion" is withdrawn. Applicant canceling the term "portion".

All other rejections present within Paper no. 21 are herein incorporated by reference.

Applicant argues that his definition of "transparency" set forth in the specification in one full sentence is clearly defined. That being transparency is meant as the property of a medium in which neutrons undergo mostly elastic scattering (specification page 2, lines 30-32).

As previously set forth the examiner disagrees. Applicant within the specification pages 2-3 sets forth his transparency definition as being two steps, (1) and (2). Applicant correctly sights only part of step (1). Step (1) is further expounded upon on page 3, lines 3+ of the specification wherein applicant further cites a doping of the diffusing medium making it "cloudy" and consequently allowing for neutron capture by the subject impurities. As previously set forth neutron capture by applicant's own definition occurs within the diffusing medium. Therefore the diffusing medium is truly not elastic. In fact as admitted by applicant it is only mostly elastic. The specification provides no relevance of

Art Unit: 3641

what mostly elastic is construed to be, i.e., 2/3, 5/8,  $\frac{3}{4}$ , etc. Mostly only involves greater than  $\frac{1}{2}$ . However, no standard is set forth by applicant.

The examiner referring to the definition of transparency (Per A glossary of Terms in Nuclear Science and Technology, 1957 the term transparency is defined as being to permit the passage of radiation particles) has clearly shown applicant's definition to not be consistent with that set forth in the art. *That is no mention of elastic or inelastic scattering is present in the definition* [emphasis added]. Applicant by defining his transparency in relation to elastic scattering has set forth a definition repugnant to the accepted definition within the art.

While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See In re Hill, 161 F.2d 367, 73 USPQ 482 (CCPA 1947).

Applicant argues that he cannot follow the interpretation of the prior art (Principals of Nuclear Reactor Engineering, 1955 p. 87-88) provided by the examiner. Principals of Nuclear Reactor Engineering, sets forth that lead and bismuth (both of applicant's diffusing medium materials) act like light nuclei with respect to inelastic scattering. That is light nuclei tend to not undergo inelastic scattering; however, there is no standard set forth by applicant what constitutes mostly elastic scattering, i.e., 2/3, 5/8,  $\frac{3}{4}$ , etc. Thus, while hydrogen may undergo no interactions, heavier nuclei in comparison to hydrogen, such as Oxygen do. Likewise lead and/or bismuth also undergo some inelastic scattering. There is no indication what is an acceptable level of inelastic scattering within applicant's disclosure. Thus, as set forth previously, the

Art Unit: 3641

specification is insufficient in defining how and in what manner applicant achieves mostly elastic scattering in his diffusing medium when the prior art indicates that the materials in question (i.e., lead/bismuth), be it slight or great, act as inelastic scatterers.

As set forth before and above applicant adds material impurities to his diffusing medium to make it "cloudy". By doing so neutron capture occurs by the subject impurities. Thus, neutron capture is occurring within the diffusing medium. Again as previously set forth inelastic scattering is occurring within applicant's diffusing medium. That is applicant's diffusing medium is not mostly elastic scattering and therefore by applicant's own definition is not substantially transparent.

As before there is no adequate description nor enabling disclosure of the parameters of the specific operative embodiments of the invention. Particularly the diffusing medium as set forth on page 3, lines 3+ of the specification discloses impurities present in the diffusing medium that account for a "cloudy effect" that allows for most of the neutrons to be captured by said impurities. There is no indication of the exact density and ratio of impurities within the diffusing medium. Furthermore it is not seen wherein what constitutes said impurities. Thus without said impurities the diffusing medium cannot function as claimed. That is the transparency of the applicant's diffusing medium depends on said impurities. Without such knowledge of what constitutes said impurities, their ratio, density, etc. within the diffusing medium one cannot replicate applicant's claimed invention.

Applicant argues that in the context of the disclosure, it is evident that the "impurities" which "dope" the diffusing medium consist of the material for which exposure to a neutron flux is looked for in the claimed method. Applicant cites that the increased neutron capture efficiency is achieved with the help of the nature and of the geometry of the medium surrounding the source, in which a small amount of the element to be transmuted ("impurities") is introduced in a diffused way ("doped"). Those skilled in the art immediately understand that what would make the medium "cloudy" in the optical analogy is the isotope in which neutron capture is expected.

The examiner disagrees for the reasons set forth above. No amounts of impurities are set forth. One skilled in the art cannot ascertain such. Applicant's definition of transparency as pointed out above is inconsistent with the accepted meaning. Even applicant's own definition is contradicted. Mostly elastic yet doped to provide inelastic properties.

Lastly in regard to the transparent diffusing medium. It appears now based on applicant's arguments that only a select few mediums are possible (i.e., lead an/or bismuth). Thus claim 1 appears to be broader than the enabling disclosure as not all transparent medium can be used in applicant's invention to achieve the desired results. As set forth above one cannot replicate applicant's claimed invention without knowledge of what constitutes the diffusing medium including the impurities, their ratio, density, etc.

Art Unit: 3641

With regard to the 112, 1<sup>st</sup> rejection of the terms "inner buffer region" and "outer buffer region" applicant argues that such language is supported in the specification. First buffer layer (3) and a further buffer layer (5).

The examiner again contends that such language is not supported. As in applicant's arguments, specification and drawings there are two distinct and separate buffers. While the buffers can be the same material they are separate. This is evident by the activity volume (thin tubes) located between the two buffer layers. From the specification and drawings (figure 7b) there appears to be no intermixing of the two buffers. The claim language reads on a single buffer having an inner and outer layer or region. Clearly, this is not the case. Applicant needs to revise his claims to be consistent with his claimed intent. Two separate and distinct buffers having diffusing medium located therein.

Applicant argues the 112, 2<sup>nd</sup> rejection of the terms "inner buffer region" and "outer buffer region". Applicant argues that claims 1 and 17 only recite an "inner buffer region". An "outer buffer region" is recited in dependent claims 5 and 20.

As before and as admitted by applicant there are two separate and distinct buffer regions/layers. This is not the case. The claims are indefinite as they read on a single buffer having an inner and outer region. Claims 1 and 17 call for an "inner buffer region", if an inner region is present than there must inherently be present an "outer buffer region".

With regard to the Bowman reference applicant argues that the molten salt of Bowman cannot be transparent as defined by the definition set forth by the examiner (1957 glossary).

It is not clear how applicant can perceive Bowman as set forth in the rejection of Paper no. 13 not to read on his claimed inventive concept. The molten salt of Bowman being the first diffusing medium doped with beryllium to enhance neutron multiplication. Therefore, the first diffusing medium of Bowman being substantial transparent to neutrons. That is the first diffusing medium of Bowman is transparent in accordance with the accepted meaning in the art (permit passage of radiation or particles). Bowman's first diffusing medium permits the passage of neutrons to interact with the to be exposed material. Even if applicant's definition (mostly elastic) were considered to be correct Bowman meets this as well. The first diffusing medium of Bowman being mostly elastic or transparent to neutrons.

As set forth above, with the exception of the rejections withdrawn by the examiner, the rejections of Paper no. 21 are herein incorporated by reference.

### ***Conclusion***

2. This application contains claims 10, 11, 13-16, 26, 27, 29, 30 and 33-48 drawn to an invention nonelected with traverse in Paper No. 12. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Art Unit: 3641

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack W. Keith whose telephone number is (703) 306-5752. The examiner can normally be reached on Monday-Thursday 6:30-5 p.m., with Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on (703) 306-4198. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jack W. Keith  
Primary Examiner  
Art Unit 3641

jwk  
August 11, 2004